may take up, but conservative as to the conclusions it draws. The volume is arranged chronologically, and the contents give full information as to where the reports of the various subcommittees appear. These reports contain numerous tables giving analyses and classifications of paint materials.

UNIVERSITY AND EDUCATIONAL NEWS

At the meeting of the National Association of State Universities, which was held recently in Washington, D. C., a committee was appointed to draw up plans and policies to be submitted to congress for its approval. A bill will be presented asking for $500,000 as the first step in the organization.

A fund of $500,000, which the Knights of Columbus of this country have been collecting for more than two years for the Catholic University at Washington, has been completed. The gift, it is understood, will be presented to the institution some time during the Christmas holidays.

The board of regents of the University of California has announced the completion of the additional fund of $600,000 for the erection of the hospital building which is to be a part of the College of Medicine of the university. It is stated that the principal donations to the fund are from Mr. and Mrs. William H. Crocker, Templeton Crocker and Mrs. C. B. Alexander, New York, who contributed $150,000, and Mr. John Keith who also gave $150,000. A committee has been appointed to administer the fund and supervise the erection of the building.

The library of the late Dr. Ernest Ziegler, professor of pathology at Frieburg, founder of the *Beiträge zur Pathologische Anatomie* and author of the well-known text-book on pathology, was presented formally to the medical department of the University of Pittsburgh on December 4. The donor is Mr. Richard B. Mellon of Pittsburgh.

Faculty promotions at Oberlin for the coming year include: Robert A. Budington, associate professor of zoology, to be professor of zoology and head of the department; Dr. George R. M. Wells, instructor in psychology, to be associate professor; Dr. S. P. Nichols, as associate professor of zoology. New appointments include: Dr. Charles G. Rodgers, to be professor of zoology. Dr. Rodgers's academic record is as follows: A.B., Syracuse University, 1897; A.M., Syracuse, 1899; Ph.D., California, 1904; instructor in zoology, Syracuse, 1899–1902; assistant professor, 1905–07; associate professor, 1907–11, and professor since 1911.

New members of the staff of instruction of the Throop College of Technology are Franklin Thomas, B.E., Iowa, associate professor of civil engineering, and Howard J. Lucas, B.A., Ohio State University, M.A., Chicago, instructor in chemistry in place of Charles A. Brautlecht, resigned. Professor Thomas has done graduate work at McGill University and has been a member of the engineering staff at Michigan. He has also had practical experience.

DISCUSSION AND CORRESPONDENCE

MORE DATA ON THE HISTORY OF THE DOLLAR MARK

Private correspondence carried on since the publication of my article on the evolution of the dollar mark in the *Popular Science Monthly* for December, 1912, has brought to my attention some new material and a few minor corrections, which seem worthy of publication. I may say at the outset that the new material does not modify the conclusion I had reached, viz., that the modern dollar mark descended from p^s, the Spanish-American abbreviation for "pesos." As a first correction, my former statement that in Argentina, $ is placed after the numerals, thus 65 should be modified by inserting "usually" or "frequently." In the newspaper *La Prensa,* published in Buenos Aires, the $ usually follows the numerals in the short advertisements, but usually precedes the numerals when they are arranged in columns. Again, I said that the $ occurred in the Hawaiian edition of 1845 of Warren Colburn's "Mental Arithmetic," but the corresponding secretary of the Hawaiian Historical Society kindly informs me that the

edition of 1835 contains the $ and that there was a still earlier edition which he had not seen. I had stated that, in 1802, William A. Washington used the $; Mr. E. Tobitt, of the Omaha Public Library, informs me that an original ledger of George Washington himself, owned by the library, contains the $ frequently. The earliest date of the ledger is January 1, 1799. It would be interesting to receive reports about older Washington ledgers on this point.

Of value, by way of corroboration of our conclusions, is the following quotation from a letter of Professor H. E. Bolton, of the University of California. He says:

I see that your conclusion is just what mine was, with the difference that yours is based upon wide research, in different languages, while mine was based upon incidental observations in connection with work on Spanish manuscripts.

Most interesting information relating to the early use of the dollar mark is contained in a letter which I received recently from Mr. Augustus H. Fiske, of Cambridge, Mass. Mr. Fiske points out that the modern dollar mark occurs in a diary of Ezra L'Hommedieu for the year 1776. This date is two years earlier than the earliest occurrence of the modern dollar mark that is mentioned in my article in the *Popular Science Monthly*. Mr. L'Hommedieu was a native of Southold, Long Island. After graduating from Yale he practised law in New York City. He was a member of the New York Provincial Assembly which, on July 10, 1776, styled itself the Convention of the Representatives of the State of New York. During a portion of his service he kept a diary stating what took place in the assembly. This is still in the possession of his descendants. The first date mentioned in the diary is June 10, 1776. It ends abruptly on December 5, 1776.

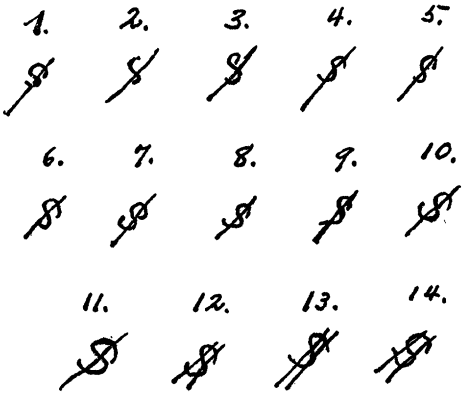
Before August 21, 1776, most of the sums of money mentioned in the diary are expressed in pounds and shillings. When dollars are mentioned, the word "dollars" is written out in full. On August 21 occurs the first use of the dollar mark in the diary (see tracing 1). I quote the following from Mr. Fiske's letter:

The item reads, Treasurer to advance to Capt. Wisner $580 for bounty. On P. M. Aug. 24th. Hugh Doyle is to receive 8 dollars. Here the word is spelled out once more. Meanwhile English money continues in other items. Under date of A. M. Aug. 28th. the treasurer is to advance $10 for removing military stores from N. Y. Here we have the second occurrence of the $ sign (tracing 2).

During the next few weeks appropriations in dollars become more frequent, though the English money still predominates and the dollars are still spelled out. On A. M. Octr. 2d, a loan of $100,000 is obtained from the Continental Congress (tracing 3), and on Oct. 3d and 4th the same sum is referred to in a similar way (tracings 4 and 5). On the latter date the treasurer is also to pay $6412 2/3 bounty money to the rangers (tracing 6). The $ sign now appears more frequently. On Octr 11th both A. M. and P. M. it appears in reference to the loan of $100,000 and an advance of $200 to the troops of Orange County (tracings 7 and 8); and the $100,000 again appears on Octr. 14th A. M. (tracing 9).

Meanwhile references to English money continue, but only one to dollars, written out, on A. M. Oct 15th. That same day $10,000 was appropriated to buy clothing for the troops (tracing 10), and the next morning $100 was given to encourage the manufacture of flax (tracing 11).

The next two weeks contain fourteen items of



English money and it is not till P. M. Octr. 31st that Uriah Mitchell applies for cash on account of wages as a daily rider and received $100 on account (tracing 12). The appropriation was approved the next morning and referred to as $100 (tracing 13). English money is now referred to until P. M. Nov. 9th when E. Benson Esqr., is to

apply to the General Court of New Hampshire for $1000 (tracing 14). Thereafter until the end of the book the money is all in English pounds.

We see in the above the gradual substitution of the conventional $ sign for the spelled word. The spelling out of the word becomes less and less frequent as the record proceeds. If we examine the tracings of the signs, we find that the first eleven have the S crossed by only one line. The last three have the double line as it is used at the present day.

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A NON-CHROMATIC REGION IN THE SPECTRUM FOR BEES

To the Editor of Science: The brilliant work of Professor K. v. Frisch, of Munich, on the color sense of bees (which follows upon his very ingenious investigation of the color sense of fishes and of crabs) seems to have been strangely overlooked in this country, where more confidence is placed in the very insufficient (from the point of view of logic) conclusions of Hess than they deserve. v. Frisch carried on his experiments on bees in the open air, in the close vicinity of an aviary; he found that a single day's training was sufficient to enable many hundreds of bees to form the association: Whatever is blue is sweet, whatever is gray (of any one of thirty-two different shades) is not sweet. In the same way they were able to learn, later, that yellow indicates sweetness; no amount of training, however (they were tried steadily for ten successive days), could teach them to distinguish between red and black. Training for green had to be postponed for another year, on account of the oncoming of the cold and rainy weather of autumn, which rendered the bees too sluggish to carry on the work.

Professor v. Frisch's results are so striking, especially the proof of the total blindness to red of his bees (shown already by Washburn and by Watson in the case of higher animals), and his method (which I do not give here) was so good—so convincing and so little consumptive of time—that I was anxious to have him, when the weather permitted, put to the test a question which had been in my mind for some time, namely, whether, when animals are insensitive to red, there can not be found a certain blue-green (its complementary color) to which they are also insensitive—whether they have not, in other words, a dichromatic (yellow and blue) color system only. I therefore wrote to Professor v. Frisch some three weeks ago on this point, and I have now received a reply from him. He writes me that he has already tried the experiment, and that my *Vermuthung* is justified. There is a completely non-chromatic region for the bee in that part of the color-spectrum which corresponds to blue-green for the normal eye: no amount of training enabled the bees to pick out this color from the series of grays, although, as I have said, a single day sufficed to train them to alight, in hundreds, on yellow, or on blue, and to leave the grays entirely unvisited. This, combined with the fact that the point of maximum brightness for bees is shifted well towards the green (the circumstance which led Hess to the erroneous conclusion that bees, as well as all other invertebrates together with fishes, are insensitive to chroma—that they have achromatic vision only) shows in fact that their vision is dichromatic instead of tetrachromatic, that their colors are yellow and blue, and that their vision resembles in type the protanopic form of red-green blindness.

That this quite extraordinary fact—the non-specific quality to bees (as well as to fishes) of the blue-greens—has not hitherto been discovered by the investigators of the color sense of animals is easy to understand, for, since one can not readily try all the colors of the rainbow, one naturally tries first the "unitary" colors, red, green, yellow and blue, instead of the "color-blends," blue-green, yellow-green, red-yellow and red-blue (the two last are popularly but most unscientifically called orange and purple, respectively). One forgets, what ought to be a perfectly familiar fact, and would be were it not for the innumerable color-illusions which the Hering color-theory forces upon its adherents, that though the red-green blind individual never